

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1, 12 and 13 are amended. Claim 10 is canceled without prejudice or disclaimer. No new matter is added.

A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 1-9 and 11-13 are now pending in this application.

Rejections under 35 U.S.C. § 103

Claims 1, 2 and 5-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 1,174,600 A2 to Kobayashi et al. ("Kobayashi") in view of U.S. Patent No. 5,974,791 to Hirota ("Hirota"). Claims 3 and 4 stand rejected under § 103(a) as being unpatentable over Kobayashi in view of certain legal precedent. This rejection is moot with respect to claim 10, which has been canceled. Insofar as these rejections can be applied to the claims as amended, applicants respectfully traverse for at least the following reasons.

The device of claim 1 is configured to perform lean air-fuel ratio operation of a diesel engine when a trapped amount of particulate matter in a filter becomes sufficiently large to partially regenerate the filter, when the engine is operated with a rich air-fuel ratio for the purpose of eliminating sulfur oxide poisoning of the catalyst, and then to resume the rich air-fuel ratio operation to continue the elimination of sulfur oxide poisoning. In this regard, the device of claim 1 includes a programmable controller programmed to:

control the mechanism to cause the exhaust gas composition to be in a state corresponding to the lean air-fuel ratio, when the particulate matter trap amount has reached the predetermined amount during a period when the exhaust gas composition is in a state corresponding to the rich air-fuel ratio,

determine whether or not the particulate matter trap amount has reached a predetermined decrease state during a period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio, *the predetermined decrease state corresponding to a particulate matter trap amount smaller than the predetermined amount and larger than zero*, and

control the mechanism to cause the exhaust gas composition to be in a state corresponding to the rich air-fuel ratio, when the particulate matter trap amount has reached the predetermined decrease state during the period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio.
(emphasis added).

Because the predetermined decrease state corresponds to a particulate matter trap amount smaller than the predetermined amount (the point at which the exhaust gas composition is controlled to be in a state corresponding to the lean air-fuel ratio for effecting the filter regeneration) and larger than zero, the predetermined decrease state corresponds to only partial regeneration of the filter.

In contrast to claim 1, Kobayashi does not suggest controlling an air-fuel ratio mechanism to perform lean air-fuel ratio operation of a diesel engine when a trapped amount of particulate matter in a filter becomes sufficiently large to partially regenerate the filter, when the engine is operated with a rich air-fuel ratio for the purpose of eliminating sulfur oxide poisoning of the catalyst, and then to resume the rich air-fuel ratio operation to continue the elimination of sulfur oxide poisoning. Kobayashi only discloses full regeneration of its particulate filter 18 before performing an operation to eliminate sulfur oxide poisoning. Kobayashi discloses the regeneration of its particulate filter in steps S405 and S406 of FIG. 4. Kobayashi specifically discloses “In other words, it is determined in step 405 whether the particulate matters have been completely burned out by repeated execution of step 406 which will be described.” (See col. 21, paragraph [0116]). Thus, Kobayashi does not disclose performing only partial regeneration of its particulate filter before performing any sulfur oxide poisoning elimination procedure for its catalyst.

Moreover, Kobayashi does not realize the advantages of the claim 1 device where operation is controlled to interrupt sulfur oxide elimination, a partial regeneration of the particulate filter is performed, and then sulfur oxide elimination is resumed. As described in paragraph [0006] of the present specification, if a large amount of particulate matter collects

in the particulate filter when the air-fuel ratio is returned to lean for the usual operation after the sulfur poisoning is eliminated, a problem arises. Specifically, if the temperature of the exhaust gas at this time is higher than the self-ignition temperature of the particulate matter, the particulate matter trapped by the particulate filter burns rapidly. As a result, when the temperature of the particulate filter exceeds a preferable range for performance, the particulate trap performance of the particulate filter decreases. In order to prevent such a decrease in the particulate trap performance of the particulate filter, the device of claim 1 interrupts sulfur oxide poisoning elimination to perform a partial regeneration of particulate filter thus preventing the amount of particulate matter trapped by the particulate filter from excessively increasing. This control is not suggested by Kobayashi.

Hirota fails to cure the deficiencies of Kobayashi, and thus the presently pending claims are patentable over the combined teachings of these two references.

Independent claims 12 and 13 include limitations corresponding to those discussed above with respect to claim 1, and thus are allowable for analogous reasons. Dependent claims 2-9 and 11 ultimately depend from claim 1, and are patentable for at least the same reasons, as well as for further patentable features recited therein.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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